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Are You Microwaving Food in Plastic Containers? Here's Why You Should Stop

When you cook food in microwaveable plastics, toxic chemicals can migrate to your food.

By Dr. Joseph Mercola

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Story at a glance:

- When you cook your food in microwaveable plastics, toxic chemicals can migrate to your food.
- Researchers from the University of Almería in Spain tested commercially available ready-to-cook potatoes inside microwavable plastic food containers compared to those cooked without plastic.
- Significant migration of plastic chemicals occurred when the potatoes were microwaved in plastic.
- A new, potentially highly toxic compound also formed in potatoes cooked in the microwave inside microwavable plastic food containers.
- One of the simplest ways to cut down on your risk of plastic exposure from your food is to avoid cooking your food in plastic.

Supermarkets are filled with convenience foods, including those packaged in plastic, microwavable bags that you can toss in the microwave to cook whatever's inside. While they may shave a few minutes off your dinner prep time, you may be trading your health in the process.

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This is because when you cook your food in microwaveable plastics, toxic chemicals can migrate to your food.

What's more, the chemicals aren't only the familiar toxins known to exist in plastic, but also a never-before-identified compound that's created when potatoes are put in plastic and nuked.

Microwaving in plastic causes 'very pronounced' transfer of chemicals

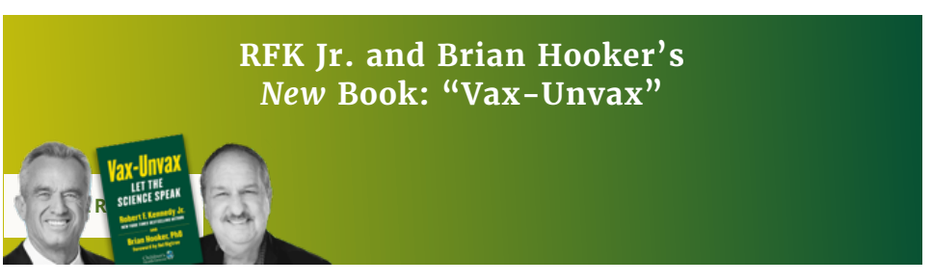
Researchers from the University of Almería in Spain suspected that the energetic conditions during microwave cooking could increase the transfer of chemicals from plastic to food when in close contact.

So, they tested commercially available ready-to-cook potatoes inside microwavable plastic food containers (MPFCs) compared to those cooked without plastic.

The study involved potatoes cooked in the microwave in a plastic bag or glass, as well as potatoes boiled in water over fire. Significant migration of plastic chemicals occurred when the potatoes were microwaved in plastic.

"It has been demonstrated that there's a very pronounced migration of polypropylene glycol (PPG) polymers from plastic bags to potatoes... [and] only when they're cooked in the microwave in contact with the plastic. That is, these PPGs — if present in the bags — aren't transferred to the food unless they're cooked together, as is done in the microwave," study author Francisco José Díaz Galiano told El País.

It's possible additional plastic compounds also migrate to the food, the researchers noted, given that "there are chemical compounds that are the exclusive result of the cooking process of the potato in contact with the plastic that aren't observed either in the raw potato, or in the one boiled in water, or in the cooked in glass in the microwave."



Potentially toxic compound created when potatoes Are microwaved in plastic

If you've ever felt inherently suspicious of the safety of microwavable plastics, the study's second finding may offer even more vindication. Plastics contain synthetic photoinitiators, such as 2-hydroxy-2-methyl-1-phenylpropan-1-one (HMPP), which may react with maltose, a natural component in potatoes to create a new compound.'

"Here we show for the first time that plastic migrants present in food contact materials can react with natural food components resulting in a compound that combines a UV-photoinitiator (2-hydroxy-2-methyl-1-phenylpropan-1-one) with maltose from potato starch; this has been identified after cooking potatoes in microwavable plastic food containers," according to the study.

Speaking with El Paiís, Díaz Galiano explained that plastics contain:

> "Synthetic photoinitiators, [which are] reactive compounds eager to interact and find something to join with to create new plastic molecules, new polymers that will arise from the creation of structures that multiply and multiply.
>
> "The microwave energy on the bag seems to trigger a process whose final

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result is a combination between one of those synthetic photoinitiators used in the synthesis of plastics — HMPP — and maltose, a natural component made of the starch from the potato."

The newly identified maltose derivative of HMPP was only found in potatoes cooked in the microwave inside microwavable plastic food containers:

> "The tentatively identified HMPP-maltose derivative is only found when potatoes are cooked inside the MPFC. The leaching and transfer of chemicals from FCMs [food contact materials] to food is thoroughly described in the literature and has also been demonstrated in this work.
>
> "This further supports the claim that HMPP-maltose derivative synthesis is taking place on the potato during microwave cooking as free maltose is released from starch and the UV-photoinitiator migrates from the MPFC to the potato during said process."

Novel compound may have 'high toxicity'

It's unknown what happens in your body when the HMPP-maltose derivative newly formed in your microwaved potatoes is consumed, but the researchers suggested it potentially has "high toxicity."

They based this on the fact that it's a Cramer class III structure, referencing the Cramer decision tree used to classify chemicals into probability of low, moderate or high toxicity.

"Cramer Class III contain structural features that permit no strong initial impression of safety, or may even suggest significant toxicity," according to research published in Computational Toxicology.

The researchers noted that the substance may accumulate in organs and form unknown metabolization products:

> "This classification is in line with the data provided for HMPP by the European Chemicals Agency (ECHA) through the REACH regulation, which states the harmful nature of the photoinitiator. The short, mid and long-term effects on human health of this in situ-formed maltose derivative are unknown.
>
> "However, the linking of exogenous molecules to glucose moieties has been shown in the past to enhance their accumulation in various organs such as the liver or the spleen. Furthermore, once the HMPP-maltose derivative enters the body, it may undergo partial or full hydrolysis, resulting in maltose and/or HMPP, amongst other unknown metabolization products.
>
> "The results presented here continue to raise the question of how safe foods cooked inside MPFCs (and foods packed within FCMs in general) are for human consumption. The migration of pre-existing known and unknown substances, in addition to in situ-formed compounds from materials deemed safe, indicates that stricter controls on these materials are urgently needed."

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Microwaving plastic food pouches releases millions of microplastics

Other research has also revealed sobering findings about microwaved plastic.

University of Nebraska researchers investigated the release of microplastics and nanoplastics from plastic containers and reusable food pouches, including those used for baby food, under different usage conditions.

Heating the containers in the microwave caused the highest release of microplastics and nanoplastics into the food.

After three minutes of microwave heating, some of the plastics released up to 4.22 million microplastic and 2.11 billion nanoplastic particles from just 1 square centimeter of area.

"Exposure modeling results suggested that the highest estimated daily intake was 20.3 ng/kg·day for infants drinking microwaved water and 22.1 ng/kg·day for toddlers consuming microwaved dairy products from polypropylene containers," the study found.

What's more, even storing the containers in the refrigerator or at room temperature led to the release of millions to billion of microplastics and nanoplastics over a six-month period.

The scientists also conducted an in vitro study to assess cell viability, which found that microplastics and nanoplastics released from plastic containers caused the death of 76.7% of human embryonic kidney cells at 1,000 microgram per milliliter concentration after 48 hours of exposure.

Other studies have found that exposure to microplastics may lead to cell death, immune responses and oxidative stress, as well as potentially cross cell membranes.

84 of 85 foods contain plastic chemicals

Even if you're not microwaving your food in plastic, there's a good chance it may contain some plastic. Consumer reports tested 85 foods, using two or three samples of each, for bisphenols and phthalates, well-known endocrine-disrupting chemicals.

Bisphenol A (BPA) was found in 79% of the samples, which included fruits, vegetables, milk, meat, seafood, baby food and more.

All of the foods were packaged, but the materials of the packaging varied from cans and pouches to plastic and paperboard. While none of the products tested contained BPA or phthalates at levels that exceeded thresholds set in the U.S. and Europe, this isn't an indication of safety.

"[M]any of these thresholds do not reflect the most current scientific knowledge, and may not protect against all the potential health effects," Tunde Akinleye, a Consumer Reports scientist who oversaw the tests, said. "We don't feel comfortable saying these levels are OK. They're not."

Food packaging has received considerable attention for its role in contaminating the food supply, and rightly so. But part of what makes the plastic problem so pervasive is that exposure occurs at each step of the food manufacturing process — starting on the farm.

Black plastic, sometimes referred to as plastic mulch, is a primary method of weed control for many organic farmers, particularly for tomato, pepper and melon plants.

Many grass and perennial weeds are unable to penetrate the plastic, which also prevents sunlight from hitting the ground and stimulating the growth of weeds. But plastic mulch may be plowed back into the fields or added to landfills as more plastic trash.

Plastic debris can contaminate water and soil near landfills while burning plastic waste cause the chemicals to be released into the air.

Microplastics from plastic trash end up in the environment, and plants can uptake plasticizers from the soil, as can animals, which consume plastics in their own food and water.

During processing, foods are exposed to another round of plastics, Consumer Reports notes, including via:

- Pasteurization, during which high temperatures may speed up leaching.
- Vinyl gloves, which may contain more than one-third plasticizers.
- Plastic tubing, used for milk and oils.
- Conveyor belts, which are often plasticized.

While the ramifications are unknown, endocrine-disrupting chemicals found in plastics may contribute to multiple health problems, including diabetes, obesity, cardiovascular disease, certain cancers, birth defects, premature birth, neurodevelopmental disorders and infertility.

Phthalate syndrome, which refers to a number of disturbances to male reproductive development that have been observed after exposure to phthalates in utero, is another risk.

Avoid cooking your food in plastic

One of the simplest ways to cut down on your risk of plastic exposure from your food is to avoid cooking your food in plastic.

The University of Almería researchers explained that even this small step can help:

> "Fundamentally, this work highlights the importance of everyday habits in terms of human chemical exposure, particularly through ingestion.
>
> "Small changes in how meals are prepared can have a significant effect on long-term chemical exposure, as evidenced by the presence of the in situ-formed HMPP-maltose derivative and the increased transfer of PPGs from the food packaging onto MPFC-microwaved potatoes.
>
> "Even if short-term and acute toxicities are deemed to be low for some of these compounds, their long-term effects at subchronic or sublethal concentrations, in combination with other chemicals, remain unknown."

You can also help reduce your exposure by becoming conscious of the plastic you're using daily — and cut back where you can.

Some steps are easy, like swapping plastic bags, bottles, straws, utensils and food containers for more durable, non-plastic reusable options.

You'll also want to choose fresh foods as much as possible. Avoid fast foods and ultra-processed foods, and choose those with minimal natural packaging or glass packaging instead.

Originally published by Mercola.

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BarbaraCharis
a month ago

Want health? Get the microwave oven out of your home! If plugged in, it emits radiation and the whole world is being radiated with all the electronic devices. In saving time using it...you are also shortening your life. It destroys most of the nutritional value in the food that has been "nuked."

4 0 Reply

BChristine
a month ago

I got rid of my microwave over a decade ago and never looked back. My toaster oven replacement has suited me just fine and I know I'm healthier for it. Those who use microwave ovens for cooking in any way are just increasing their already-overloaded EMF exposure, which will affect their health negatively. Cooking the "old-fashioned" way on stovetop or oven is a much healthier option.

2 1 Reply

christopher briscoe
a month ago

What's more, the chemicals aren't only the familiar toxins known to exist in plastic, but also a never-before-identified compound that's created when potatoes are put in plastic cont and nuked." When you wrote, "nuked", do you mean as in "nuclear bomb"?

0 0 Reply

BraveNewWhirled
a month ago

I almost never use a microwave, and certainly never with plastic or to warm veggies. There are glass and ceramics available for folks who want to warm lunch at work, but don't do it with plastic!

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